forming a microarray on a surface from the amplified genomic segments, wherein each location on the surface contains amplified material derived from a single sample and consisting essentially of a single genomic segment;

hybridizing the microarray with a mixture of labeled synthetic oligonucleotides, wherein the mixture comprises oligonucleotides complementary to the genomic segments; and

deriving genotyping information simultaneously for the plurality of samples at the plurality of genetic loci by detecting signals from the hybridized microarray to thereby genotype the multiple samples.

3. The method of Claim 1 wherein the plurality of samples comprises at least 10 distinct samples.

4. The method of Claim 3 wherein the plurality of samples comprises at least 5,000 distinct samples.

5. The method of Claim 1 wherein the genomic segments comprise human disease loci.

6. The method of Claim 5 wherein the samples are neonatal blood samples.

7. The method of Claim 5 wherein the genetic loci comprise genetic loci associated with a human gene selected from the group consisting of β-globin, CFTR, and GALT.

8. The method of Claim 1 wherein the surface of the microarray comprises at least 1000 locations per square centimeter.

9. The method of Claim 1 wherein the mixture of labeled synthetic oligonucleotides comprises ten different oligonucleotide sequences.

10. The method of Claim 1 wherein the labeled synthetic oligonucleotides are between about 10 and about 30 nucleotides in length.

11. The method of Claim 1 wherein the genomic segments each comprise between about 40 and about 1000 base pairs.

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12. The method of Claim 1 wherein hybridizing is performed in an aqueous solutions comprising salts and detergent.

13. The method of Claim 1 wherein hybridizing is performed at a temperature about 10 °C below the melting temperature of the labeled synthetic oligonucleotides.

14. The method of Claim 1 wherein the labeled synthetic oligonucleotides comprise fluorescent labels.

15. The method of Claim 1 wherein the labeled synthetic oligonucleotides comprise non-fluorescent labels.

16. The method of Claim 1 wherein the genotyping information distinguishes samples from homozygotes and samples from heterozygotes at a specific genetic locus.

17. The method of Claim 14 wherein the signals are generated by fluorescence emission from the labeled synthetic oligonucleotides.

18. The method of Claim 14 wherein the signals are generated by fluorescence emission at more than one wavelength of light.

19. The method of Claim 15 wherein the signals are generated by fluorescence emission after antibody staining.

20. The method of Claim 15 wherein the signals are generated by fluorescence emission at more than one wavelength of light after antibody staining.

21. The method of Claim 1 wherein the surface comprises glass.

22. The method of Claim 1 wherein the amplified genomic segments comprise amino linkers.

23. The method of Claim 22 wherein the surface comprises reactive aldehyde groups.

24. The method of Claim 1 wherein the microarray is formed by mechanical micro-spotting.

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25. The method of Claim 14 wherein the fluorescent labels comprise dendrimer labels.

26. A method of simultaneously genotyping multiple samples, the method comprising:

amplifying a genomic segment comprising a genetic locus from a plurality of samples using polymerase chain reaction primers;

forming a microarray on a surface from the amplified genomic segments, wherein each location on the surface contains material derived from a single sample;

hybridizing the microarray with a mixture of labeled synthetic oligonucleotides, wherein the mixture comprises oligonucleotides complementary to the genomic segment; and

deriving genotyping information for the plurality of samples simultaneously by detecting signals from the hybridized microarray to thereby genotype the multiple samples.

27. (New) A method of simultaneously genotyping multiple samples, the method comprising:

amplifying a plurality of genomic segments from a plurality of samples using a plurality of polymerase chain reaction primers, each genomic segment comprising a distinct genetic locus;

forming a microarray on a surface from the amplified genomic segments, wherein each location on the surface contains amplified material derived from a single sample and comprising at least one genomic segment;

hybridizing the microarray with a mixture of labeled synthetic oligonucleotides, wherein the mixture comprises oligonucleotides complementary to the genomic segments; and

deriving genotyping information simultaneously for the plurality of samples at the plurality of genetic loci by detecting signals from the hybridized microarray to thereby genotype the multiple samples.

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